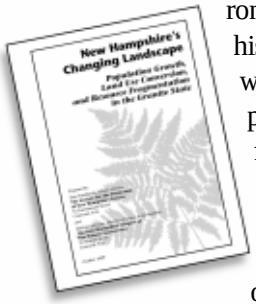
project WEB
spring 2001
Connecting Projects WILD, WET and Learning Tree in New Hampshire

New Hampshire's Changing Landscape

New Hampshire is blessed with an extraordinary and diverse natural environment that has shaped our history, our economy, and our way of life. We justifiably pride ourselves on the farms, forests, rivers, lakes, and mountains that give our state its unique character, provide for a high quality of life, and sustain some of our most important industries. But the fabric of our natural and rural landscape is at risk due to sustained, high levels of population growth and development.



A recent study entitled *New Hampshire's Changing Landscape*, by the SOCIETY FOR THE PROTECTION OF NEW HAMPSHIRE FORESTS, documents the growth New Hampshire has already accommodated and what the effect of growth and development over the next 20 years will be on the state's landscape. The report applies the latest scientific information to identify the extent and distribution of some of the most critical natural resources that make up New Hampshire's landscape.

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IN THIS ISSUE

Using Maps to Detect Change

You might think that maps are only useful to navigate your way around an unfamiliar city. But they actually have a number of unique functions and take many different forms: soil maps, topographic maps, street maps, wetland maps, land cover maps, and watershed maps, to name a few. One of the most powerful uses of maps, however, is to detect change. The idea of comparing an older map to a newer one is not novel, but the capability to place the older map on top of the new one and digitally analyze where, how much, and what type of change has occurred is. In the past, this would be done manually by making a map from historical remotely sensed data (aerial photographs and satellite images) and comparing it to a map made from newer remotely sensed data. This technique was very time-consuming. But now, this process can take only a few hours by utilizing GIS (Geographic Information System) and digital image processing software. By utilizing this technology, the analysis and research possibilities are virtually limitless. For example, communities can use these techniques to estimate and manage urban sprawl or development and track changes in the direction/erosion of rivers. Scientists can also determine rates of deforestation, track the changing health of vegetation, and analyze the relationship of changing landscapes to climate change.

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"As we grow, we must preserve what is special about New Hampshire, the traditional character of our communities, our forests and farms, and our historic buildings and downtowns."
Governor
Jeanne Shaheen,
February 2000

SPRAWL

How it Affects Water Quality

Okay, it's time for a little test. See if you can answer the following question:

The leading cause of water pollution in the world today is _____?

A) Oil spills
B) Waste dumped by factories
C) Road, lawn and household chemicals in runoff
D) Untreated sewage
E) Litter

It might come as a surprise to learn that the correct answer is (C) "Road, lawn and household chemicals in runoff." If you did not get the correct answer, don't despair. Both a 1998 Survey by Roper Starch Worldwide and a 2000 study commissioned by International Project WET found that most people cannot correctly identify the leading cause of water pollution today. In fact, most respondents incorrectly answer that factories dumping wastes into rivers, lakes, and oceans are the main water polluters. So if you answered (B), you are not alone. The truth is that this type of pollution (known as a point source) is now under heavy regulations as a result of the Clean Water Act of 1972 and is not a major cause of concern. Instead, a type of pollution known as nonpoint source pollution (NPS) is responsible for the majority of water pollution today.

Nonpoint source pollution can be thought of as polluted runoff. Imagine rainwater or water from snowmelt traveling through a watershed. As the water travels downhill, it picks up substances that are left on roads, parking lots, and fields, such as oil, antifreeze, road salt, fertilizers, pesticides, household chemicals, pet wastes, sediments, and other nutrients. These substances mix with the runoff, travel with it through the watershed, and usually end up in a local waterbody. The effects of nonpoint source pollutants on different water bodies vary. However, we do know that these pollutants have harmful effects on drinking water supplies, recreation, fisheries, and wildlife.

What is Sprawl?

Sprawl refers to the development of residences, businesses, and industries outside of traditional downtowns and their proliferation in outlying areas.

Increases in this type of pollution are closely tied with increased sprawl. As communities spread outwards, many activities occur which increase nonpoint source pollution. Foremost, sprawl contributes to an increase in the amount of paved surfaces, which can be a problem for two reasons. First, paved roads, driveways, and parking lots collect many nonpoint pollutants like oil, antifreeze, and road salt and in a sense "store them" until the next rainstorm washes them away. Second, paved areas are impervious to water. Therefore, they restrict rain from infiltrating the ground. This results in a greater volume of runoff and less water reaching groundwater aquifers, which supply drinking water to more than 65% of New Hampshire's residents.

In addition, the practices of some homeowners often change as they move outward from urban areas. In more suburban areas, people are more likely to own larger residential properties where having a well-manicured lawn may be

continued on next page

What is a Watershed?

A watershed is all of the land area that drains into a particular body of water. Within every watershed, water runs to the lowest point on the landscape – a stream, river, lake, estuary, or ocean. Everyone lives in a watershed. Therefore, everyone's actions impact the quality of a water body.

© GEOFF JONES PHOTO

The image above is a poignant example of how sprawl contirbutes to paved surfaces, increasing nonpoint source pollution.

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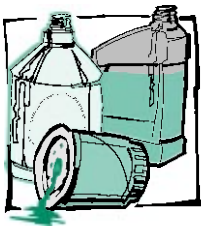
seen as a status symbol. Often times, producing one of these lawns involves excessive watering (producing more runoff) and excessive use of fertilizers and pesticides (resulting in more nonpoint source pollutants). In some cases, these homeowners may unknowingly add other nonpoint source pollutants to the environment if they irresponsibly dump used motor oil or excess household cleaners down the drain (often into a septic system), in their yards, or down a storm drain.

Finally, the increased construction that accompanies sprawl can also contribute various nonpoint source pollutants. The loss of trees and vegetation on most construction sites often leads to large amounts of sediment eroding from the exposed soils.

Because of its diffuse nature, nonpoint source pollution is not as easy to stop as factory and sewage dumping. The main tool that works against nonpoint source pollution is education. When people understand how their actions can affect the quality of a water body near them, they will often change their practices. So read on to learn more about what you can do to protect water quality!

What can you do to protect water quality?



- ✓ Keep litter, pet waste, leaves, and debris out of storm drains—these outlets may drain directly to lakes, streams, rivers, and wetlands.
- ✓ Apply lawn and garden chemicals sparingly and according to directions.
- ✓ Dispose of used oil, antifreeze, paints, and other household chemicals properly, not in storm sewers or drains. If your community does not already have a program for collecting household hazardous wastes, ask your local government to establish one.
- ✓ Clean up spilled brake fluid, oil, grease, and antifreeze. Do not hose these substances into the street where they can eventually reach local streams and lakes.
- ✓ Control soil erosion on your property by planting ground cover and stabilizing erosion-prone areas.

Activities Related to Articles in This Issue

Project Learning Tree suggests:

In *Planning the Ideal Community,* students explore the elements that compose a human community. Through surveying the area around their school and learning about community systems, students will learn how to plan a community that meets the needs of all of its members.

In *Then and Now* students will examine changes that have occurred in their community to understand how people affect and alter the environment in which they live.

Planning decisions affect a particular piece of land and, in turn, the people who use that land. In *We Can Work It Out,* students will establish processes for planning and resolving conflicts about land use.

Project WET suggests:

The Project WET favorite, *Sum of the Parts*, has students demonstrate how everyone contributes to the pollution of a river as it flows through a watershed.

In *A-Maze-Ing Water*, students guide a drop of water through a maze of "drainage pipes" to learn how activities in the home and yard affect water quality.

Through the interpretation of maps, students analyze land use changes over time and their effects on runoff and water quality in *Color Me a Watershed.*

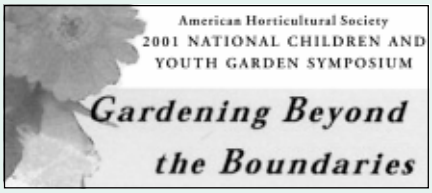
Project WILD suggests:

Changing the Land has students define fragmentation and compare historical aerial photographs with current ones. In *Planning for People and Wildlife* and *To Zone or Not To Zone,* students describe considerations that are important in land use planning and prescribe actions that can be taken to enhance some contemporary cities as places in which both people and wildlife can live.

Mark Your Calendar!

June 24 – *The Granite Landscape of Mt. Welsh*. Join noted ecologist-author Tom Wessels on a hike up Mt. Welsh as he interprets plant communities common to open granite ledges, 10 a.m. - 3 p.m. For more information or to register, e-mail signup@spnhf.org or call Trish at 224-9945.

June 30 – July 15 – *Great American Secchi Dip-In* is a chance for citizens to take a water clarity measurement from a local lake or pond, using a secchi disk. Disks can be borrowed from NHDES and UNHCE. For more information, visit www.dipin.kent.edu



July 9-10 – *Ground Water Institute for Teachers* at Waterville Valley. For more information, contact the American Ground Water Trust at 603-228-5444 or see their website at www.agwt.org.

July 12-14 – *2001 National Children & Youth Garden Symposium*, "Gardening Beyond The Boundaries" hosted by American Horticultural Society, Michigan State University. For details: http://ahs.org/ygs/ygshome.htm or 800-777-7931 ext. 121.

July 26 — *The Ice Storm in Summer*. Learn how the ice storm of 1998 is still affecting our forests at the Rocks Estate in Bethlehem through this thematic PLT workshop. For details, contact NH Project Learning Tree, 800-677-1499 or info@nhplt.org.

July 23 - August 3 – *Watershed Ecology Course* from 8:30 a.m. - 4 p.m. at St. Paul's School in Concord. For more information, contact Aquatic Resources Education, NH Fish and Game Department at 603-271-3212, e-mail: aquaticed@wildlife.state.nh.us

September 14-16 – *New England Environmental Education Alliance Conference*, Waterville, Maine. Contact Dot Lamson at 207-882-7323.

September 21 – *Make A Splash with Project WET*, vicinity of Orford, NH. Contact Judy Tumosa at 747-3416.

October 13 – *Focus on New Hampshire Forests*. Want more tools to help you teach about the forests of our great state? Then attend this workshop at Massabesic Audubon Center in Auburn. Register for this PLT workshop by calling 668-2045.

October 19 – *Kids Taking Environmental Action in their Communities*. Attend this PLT workshop to learn great strategies for community action projects and to become eligible for special grant funds. Register with NH Project Learning Tree, 800-677-1499 or info@nhplt.org.

LANDSCAPES *continued from page 1*

Whether these resources are large blocks of forest land, productive farm soils, plant and animal habitat, or drinking water supply lands, they are strategically valuable to our human community.

Highlights of the study reveal the following changes:

- New Hampshire is the fastest growing state in the Northeast.
- The state's population has more than doubled since 1950.
- Population is expected to grow 23% in the next 22 years, adding another 350,000 persons.
- The number of persons per household in NH was 3.16 in 1970; and 2.68 in 1990. Today, for each new house built the state added only 1.6 persons.
- From 1982 to 1992, 129,600 acres of forest land, 15,400 acres of crop land, and 5,300 acres of pasture land were lost to development.

Exploring Environmental Issues: *In the Places We Live*

PLT is developing a new secondary module called *Exploring Environmental Issues: In the Places We Live*. This module will explore the many facets of this theme, dealing with topics as varied as urban growth, energy use, land use, water quality, transportation, and economics. It will help students examine the relationship between people, communities, and the environment that defines our neighborhoods.

As with all its curriculum materials, PLT will rely on the involvement of educators and experts in developing this module. If you would like to participate, fill out the Reviewer Form at www.plt.org/html/curriculum/reviewer.htm.

MAPS *continued from page 1*

Although maps can be incredibly valuable, their accuracy is not always perfect. How much error there is in a map can only be determined by collecting ground data to verify the maps. Students and teachers in The GLOBE Program worldwide are assisting a team at the UNIVERSITY OF NEW HAMPSHIRE by collecting land cover data. They report it through the Internet, where it is used to validate maps made from satellite imagery. To find out more about this program, visit www.globe.gov or contact Jennifer Bourgeault at (603) 862-4178 or jen.bourgeault@unh.edu. WEB

Teachers explore different map-making techniques and uses.

Wild New Hampshire
NH Fish and Game Workshop Series for Educators

NH FISH AND GAME DEPARTMENT and NHPTV will team up to bring a series of workshops for educators on the natural world of New Hampshire on the third Thursday of each month during the school year (except December). Naturalists and experts in the field will present these sessions. To allow the greatest number of teachers to participate, these workshops will be presented via the GRANITE STATE DISTANCE LEARNING NETWORK. Sites include: NHPTV in Durham, Bow High School, North Country Education Foundation in Gorham and White Mountain Regional High School in Whitefield. Topics include: Biodiversity and New Hampshire's Natural Communities, New Hampshire's Changing Wildlife Landscape, Endangered and Species of Concern, Black Bears, Winter Ecology, Wildlife Myths, Amphibians and Reptiles of New Hampshire, Great Bay Estuary and Salt Marshes. Workshops can be viewed individually or taken as a complete series. Workshops will last from 4 p.m. to 5:30 p.m. Light refreshments will be served.

Cost of each workshop is $10 for the first teacher from a school and $5 for each additional teacher. Register for the entire series for only $30 per person.

Dates: *September 20, October 18, November 15, 2001, and January 17, February 21, March 21, April 18, May 16, 2002.*

To register, fill out the form below and mail with your payment or PO # to: *Wild New Hampshire Series,* NHPTV Knowledge Network, 268 Mast Road, Durham, NH 03824.

Name:_____

Home Address:_____

School Address:_____

Phone (H):_____ Phone (S):_____

School & Grade:_____

I plan to view the workshops at:

❒ Durham ❒ Gorham ❒ Bow ❒ Whitefield

Register me for the entire series ($30) ❒

Register me for the following sessions:

2001 ❒ September 20 ❒ October 18 ❒ November 15

2002 ❒ January 17 ❒ February 21 ❒ March 21 ❒ April 18 ❒ May 16

Price per session: *$10 first teacher, $5 each additional teacher*

Payment options:

❒ Check ❒ PO# _____

❒ Charge Card (Mastercard/Visa/AMEX) Number:_____ Expiration date:_____

ANNOUNCEMENTS

Make a Splash with Project WET

Over 25,000 students throughout the country, including more than 600 in New Hampshire and Vermont, will celebrate water during the second annual *Make A Splash with Project WET Day*, September 21, 2001. The New Hampshire/Vermont joint festival will be held at a site within the Rivendell School District (Orford, NH, and Fairlee and Vershire, VT). Other local districts will be invited, space permitting. For more information, contact Judy Tumosa at 747-3416. If your school or district is interested in being considered as a site for this annual event in 2002, please contact Nicole Clegg at 271-4071.

NH Hosting 2002 Environmental Education Conference

Preparations are now underway for the *2002 New England Environmental Education Alliance Conference* to be held in New Hampshire. NH Environmental Educators, the state environmental education professional association, is coordinating this event. If you would like to be involved in the planning, contact NH Fish and Game's Judy Silverberg at 271-3211.

Wildlife Kits - Treasure Chests of Ideas and Activities

A series of six wildlife kits was developed with elementary and middle school teachers in mind. The kits are full of resources to assist you in teaching six thematic units: mammals (K-3), birds (K-3), trees (2-6), insects and spiders (K-3), wetlands (4-6), and the New Hampshire landscape (4-8). Each kit contains a notebook with a sequence of 7-8 days of thematic activity ideas, along with the tools necessary to carry them out. The activities were drawn from a number of award winning curricula including *Hands On Nature*, *Project WET*, *Project WILD and Project Learning Tree*, and *Wonders of Wetlands*. All were chosen to help meet objectives within the NH Curriculum Frameworks. In addition, puppets, artifacts, posters, and a variety of other materials are found in each kit. Resource guides augment the background material.

Each kit was designed with specific objectives based on the materials, grade level and theme. The kits were developed by the UNH Cooperative Extension and the NH Fish and Game Department with assistance from Project WET, Project WILD and Project Learning Tree. They are available for two weeks at a time from the NH Fish and Game Department in Concord. Kits can be reserved by calling 271-3211.

Environmental Education Institute: Community Mapping

This 13 – day course is designed for educators interested in exploring local natural resources using Geographic Information System (GIS) technology. GIS is a powerful, computer-based technology that allows users to create, map, manage, analyze and manipulate spatial information. The course will combine learning about natural resource management and planning with developing skills in ArcView7 GIS software. Participants will map natural resources and explore protection strategies for their communities. Conservation Commission and Planning Board Representatives are also encouraged to participate. Participants will receive a CD with data for their community. Participating schools will receive a free ArcView7 site license, courtesy of Environmental Systems Research Institute.

Co-Sponsors: UNH Cooperative Extension, UNH Complex Systems Research Center, NH Office of State Planning, Audubon Society of NH, the Society for the Protection of NH Forests, US Geological Survey, Natural Resources Conservation Service, NH Fish and Game Department, and NH Division of Forests and Lands.

Location: Durham, Thompson School, Putnam Hall, Rm. 20-21

Dates: May 31, July 5-6, July 9-13, July 16-20 (13 days total)

Times: 8:30 a.m. - 4 p.m(except May 31 will be 4 p.m.- 8:30 p.m.)

Credit: 2 credits (optional)

For a course brochure, contact:
UNH Cooperative Extension
Water Resources Program
Nesmith Hall, Rm. 218
Durham, NH 03824
Ph: 603-862-1029
E-mail: water.resources@unh.edu

Space Still Available in Environmental Education Institute, Watershed Ecology Course

There is still space in the Watershed Ecology Course that will run from July 23 - August 3 (10 days) from 8:30 a.m. - 4:00 p.m. at St. Paul's School in Concord. This course is co-sponsored by NH Fish and Game Department, UNH Cooperative Extension, NH Audubon Society and NH Environmental Educators.

For more information contact:
Aquatic Resources Education
NH Fish and Game Department
2 Hazen Drive
Concord, NH 03301
Ph: 603-271-3212
E-mail:
aquaticed@wildlife.state.nh.us

New Book on Teaching Environmental Literature Available

A book on using literature to teach environmental awareness to adolescents is now available to teachers of language arts along with

ANNOUNCEMENTS *continued on page 8*

ON THE

H.O.M.E.

FRONT

Schoolyards as Greenspace in Your Community

BY MARILYN WYZGA

Donald Falk of the SOCIETY FOR ECOLOGICAL RESTORATION recently identified six key problems facing the health of the environment. Of his list, he noted we have the tools at our disposal to tackle habitat fragmentation right now. Your school site can play a part in this effort. It can be the greenspace to unify habitats in your community.

School sites provide variation and diversity in the landscape, serve as wildlife corridors, and supply critical habitat not available elsewhere in the community. In addition, habitats on school grounds create shade, manage storm water runoff, retain essential moisture, serve as windbreaks and ultimately reduce energy use in the school building.

MAPPING GREENSPACE

Maps are an essential component in the greening of schoolyards. Common sense suggests you assemble maps of the immediate school site, since this is the area you'll be enhancing. Yet it is also important to survey and map the surrounding community to determine existing habitat types, land use patterns, native plant communities, prior activities on the site, and changes that have occurred over time. This information will inform your decisions about habitat enhancement and assist you in selecting appropriate native plants for your site.

The GIS (Geographic Information System) and GLOBE programs mentioned earlier in this newsletter can provide you with mapping information and skills, and help integrate your schoolyard habitat project with sound research and data collection.

URBAN CONSIDERATIONS

Urban school sites may appear to have fewer options as greenspaces or wildlife habitat. However, many wildlife species have adapted to our urban and suburban lifestyles. Gray squirrels, rock doves (the ubiquitous pigeon) and house sparrows are common. Lately, it is not uncommon to see even a coyote or moose in a downtown area. You can learn more about these urban wildlife dwellers in *Coyotes in the Crosswalk: True Tales of Animal Life in the Wilds of the City*, by Diane Swanson (Voyageur Press, 1995; ISBN 0-89658-272-8). For activities to engage urban explorers, check out *City Kids and City Critters*, by Janet Wier Roberts and Carole Huelbig (Learning Triangle Press, McGraw-Hill, 1996; ISBN 0-07-053201-X), or *Ten Minute Field Trips* by Helen Ross Russell (NATIONAL SCIENCE TEACHERS ASSOCIATION, 1990; ISBN 0-87355-098-6).

UP ON THE ROOF

If you're looking to find inspiration for creating unique habitat areas on urban school sites, look up. Consider greenspace in a rooftop garden. The AMERICAN HORTICULTURAL SOCIETY'S magazine *The American Gardener* (Sept/Oct 1999 issue) included a remarkable article on "Updated Rooftops." Author Tonda Phalen writes, "The latest development in the evolution of rooftop gardening takes the habitat concept one step further: the rooftop as a space to grow vegetation primarily to benefit the environment. Referred to variously as eco-roofs or 'extensive' green roofs…this type of planting is not designed for recreational use. It is usually established on a very thin layer of growing medium and is meant to be virtually maintenance-free. Successfully installed extensive green roof becomes a nearly self-sustaining micro-habitat." The article goes on to list materials sources, informational resources, professional consultants and recommended rooftop plants.

Imagine the rare educational potential of a rooftop garden: the host of the PBS program "Rebecca's Garden" got her start reporting weather from the rooftop garden of a Minneapolis television station!

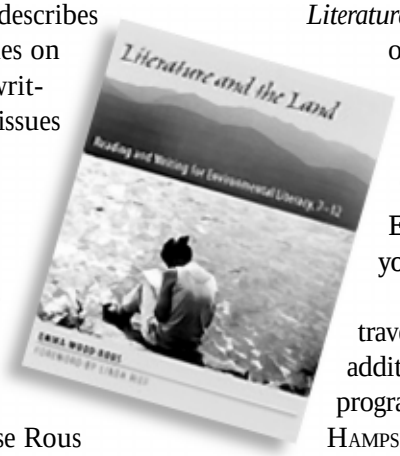
GREENING EDUCATION

You also may be inspired by the urban schoolsite renewal documented in *Natural Learning: The Life History of an Environmental Schoolyard* by Robin Moore and Herb Wong (MIG Communications, Berkeley, CA, 1997). As co-author Moore writes, "At some point during the greening process, we realized that we were indeed creating a new form of recreative-educative urban landscape…The remarkable variety of vegetation, ranging from stately trees to common weeds, brought a special richness to the site…The diversity of vegetation stimulated a hands-on playing and learning style. Together, they offered tremendous opportunities in all three realms of education: informal, formal, and nonformal. The significance of vegetation for children's development was arguably the most important lesson of the whole yard experience."

The benefits of enhancing schoolyards as community greenspace extend to wildlife, the local environment, the economy, and not least, to our children's education.

ANNOUNCEMENTS *continued from page 6*

environmental and outdoor educators. *Literature and the Land, Reading and Writing for Environmental Literacy, 7-12* (Heinemann, 2000, $22) by Emma Wood Rous describes readings and activities on perception, nature writing, environmental issues and action projects, fiction and poetry, outdoor adventure, and the history of people's relationship with nature from mythological times to the present.



Based on a course Rous taught at Oyster River High School in Durham, NH, for 20 years, the book includes interdisciplinary classroom activities and discussions, students writing, and extensive lists of resources. The "Issues and Actions" chapter engages students in problem-solving and decision making by focusing on water resources in the Southwest, land use in Alaska, wolf reintroduction, and projects in local communities. Authors discussed include Abbey, Cather, Dillard, Heinrich, Hinchman, Hyde, Kingsolver, Krakauer, Leopold, Lopez, McGinniss, McPhee, Mowat, Muir, Oliver, Shakespeare, Thoreau, Wordsworth, and Yeats.

Literature and the Land can be ordered on line, at 10% off, from www.heinemann.com.

Travel to the Great Bay Estuary without leaving your classroom!

The *It's All Connected* traveling trunk is a new addition to outreach education programming at the New Hampshire Fish and Game Department. Designed for use by elementary and middle school classes (1-6), this exciting trunk program connects you and your students with one of New Hampshire's most unique coastal treasures!

This exciting traveling trunk supports the Great Bay National Estuarine Research Reserve's *It's All Connected* curriculum.

The *It's All Connected* traveling trunk includes a copy of the curriculum along with books, videos, posters, maps, natural artifacts, and other interesting and appropriate materials for learning about the Great Bay ecosystem. Teachers may choose the lessons and activities most appropriate to their study, utilizing all or part of the curriculum. Trunk related activities are aligned with New Hampshire Academic Standards and National Science Education Standards.

So reserve the *It's All Connected* traveling trunk today! To learn more call 603-271-3211.

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